

Amendment Under 37 C.F.R. § 1.116
Application No. 09/891,511
Attorney Docket No. 010819

REMARKS

Claims 61-63 and 68-74 are pending. Claims 64-67 and 75-82 have been cancelled herein without prejudice or disclaimer. Claims 61-71 are amended herein. Claim 83 is added herein. Support for the amendments is set forth below. Support for new claim 83 is located at page 127, lines 9-22, and in Fig. 22.

Applicants' Response to Claim Rejections under 35 U.S.C. §103:

Claims 61, 64, 75-78, and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,665,968 to Meisburger et al. in view of U.S. Patent No. 4,137,476 to Ishii et al., U.S. Patent No. 6,765,217 to Nishimura et al., U.S. Patent No. 4,803,358 to Kato et al., U.S. Patent No. 6,315,512 to Tabrizi et al., U.S. Patent No. 5,536,128 to Shimoyashiro et al. and UK Published Patent Application 2171119 to Grubb et al. In response thereto, applicants have amended claim 61 to more distinctly claim the subject matter regarded as the invention. Specifically, applicants have included the following features in amended claim 61:

(a) a loader housing (40) is disposed between the mini-environment chamber (20) and the main housing (30), and the loader housing (40) includes a first loading chamber (41) and a second loading chamber (42)(page 73, lines 11-13, original claim 1, and Fig. 2 of the application);

(b) the first loading chamber (41) includes a rack (47) for placing the object (W) thereon, a shutter device (27) is provided for opening and closing a first door (272) connecting the first loading chamber (41) and the mini-environment chamber (20), and a second shutter device (46) is provided for opening and closing a second door (461) connecting the first loading chamber (41) and the second loading chamber (42), the first loading chamber (41) is

adapted to be controllable so as to have a vacuum atmosphere (page 73, line 28-page 75, line 23, and Fig.2 of the application);

(c) the second loading chamber (42) includes an arm (632) which is movable to the rack (47) for receiving the object (W) and transporting the object to the main housing (30), the second loading chamber vacuum atmosphere (page 84, line 10-page 86, line 4 and Fig. 2 of the application);

(d) a vibration isolator (42) is held in a high (37) supports the main housing (30) and the loader housing (40) thereon (page 72, lines 5-8; page 73 lines 23-28, and Fig. 2 of the application).

According to amended claim 61, a drive mechanism or robot for transporting an object, (i.e. an arm) is not disposed in a first loading chamber, but is disposed in a second loading chamber. The reason for adopting this disposition is to separate (1) a function of making a pressure changeable and (2) a function of transporting the object between a mini-environment chamber and a main housing. In other words, an object to be inspected must be transported between a mini-environment chamber which is placed under an atmospheric pressure, and a main housing which is held at a high vacuum atmosphere. Accordingly, the two functions, i.e. changing the pressure between an atmospheric pressure and a high vacuum atmosphere, and transporting the object between a mini-environment chamber and the main housing are required.

If these two functions are conducted in the same chamber, there is a danger of generating dust from the drive mechanism or transporting robot, due to a pressure variation caused around the drive mechanism. To avoid this, in amended claim 61, the first loading chamber has a function of changing a pressure from an atmospheric pressure to a vacuum pressure or vice versa,

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(i.e. a function of making the pressure changeable), and the second loading chamber has an arm for transporting the object, (i.e. a function of transporting the object), thereby preventing a pressure variation around the drive mechanism, and thus preventing the generation of dust within the second loading chamber, from which the object is transported to the main housing for inspection.

In addition, in an inspection operation using this kind of inspection apparatus, since very high inspection accuracy is required, even a slight vibration could have a highly adverse effect on the inspection results. In this kind of inspection apparatus, as defined above, the drive mechanism for transporting the object, e.g. a robot arm must be disposed between the mini-environment's chamber and the main housing. Therefore, there is a possibility that a vibration due to the driving of the drive mechanism may have an effect on the inspection results. To avoid this problem, the current invention, as defined in amended claim 61, includes a vibration isolator to support the main housing and the loading chamber (Fig. 1), so that a vibration from a floor as well as from the loading chamber is not transmitted to the main housing, and to thereby obtain an inspection result of high accuracy.

None of the cited references teach or suggest the features of separating the two functions stated above (points (a), (b),(c)) and providing a vibration separator supporting a main housing and a loading chamber (point (d)).

Meisburger (US 5,665,968) discloses an inspection apparatus for inspecting an object to be inspected by irradiating charged particles onto the object to be inspected. Ishii (US 4,137,476)

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discloses a thermal electron beam source including LaB6 as a cathode. Nishimura (US 6,765,217) discloses the primary optical system includes a multi stage multi-pole lens system. Kato (US 4,803,358) discloses a scanning electron microscope including a stage which is rotatable about an axis normal to the object-supporting surface of the stage. Tabriz (US 6,315,512) discloses a transfer device having a mini-environment chamber 604 including a HEPA or ULPA filter and an atmospheric robot 404. The mini-environment chamber is adjacent to a vacuum transport chamber 408, which is adjacent to a process chamber 410. Shimoyashiro (US 5,536,128) discloses a transfer device having a clean box 50 between a carriage box 5 and a processing apparatus 60, and the clean box 50 provides a down laminar gas flow passing through a HEPA filter. Grubb (UK 2,171,119) discloses a vacuum processing apparatus which includes a lock 18, an entry buffer 12, a processing chamber 10 and an overrun buffer 14 on the other hand, a conveyor 50, 44 for transporting a sample is provided in each chamber (page 1, lines 111-117). Hence, the cited references do not teach or suggest each and every limitation of the current invention and amended claim 61 is not obvious within the meaning of 35 U.S.C. §103.

Claims 64, 75-78 and 82 have been cancelled herein. Wherefore, applicants submit that the rejection thereof is now moot.

Claims 62, 73, and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meisburger et al., Ishii et al., Nishimura et al., Kato et al., Tabrizi et al., Shimoyashiro et al., and Grubb et al. as applied to claims 61, 64, 75-78, and 82, above, and further in view of U.S. Patent

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No. 6,344,750 to Lo et al. As the claims depend from amended claim 61, applicants submit that the rejection is addressed by nature of the claims' dependency.

Claims 66, 67, and 79-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meisburger et al., Ishii et al., Nishimura et al., Kato et al., Tabrizi et al., Shimoyashiro et al., and Grubb et al. as applied to claims 61, 64, 75-78, and 82 above, and further in view of U.S. Patent No. 5,944,049 to Beyer et al. Claims 66, 67 and 79-81 have been cancelled herein. Wherefore, applicants submit that the rejection is now moot.

Claims 63, 65, and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meisburger et al., Ishii et al., Nishimura et al., Kato et al., Tabrizi et al., Shimoyashiro et al., Grubb et al., and Lo et al. as applied to claims 62, 73, and 74 above, and further in view of Beyer et al. as applied to claims 66 and 67 above. As claims 63 and 71 depend from amended claim 61, applicants submit that the rejection is addressed by nature of the claims' dependency. Claim 65 has been cancelled herein. Wherefore, applicants submit that the rejection is now moot.

Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meisburger et al., Ishii et al., Nishimura et at., Kato et al., Tabrizi et al., Shimoyashiro et al., Grubb et al., and Beyer et al. as applied to claims 63, 65, and 71 above, Lo et al. as applied to claims 62, 73, and 74 above, and further in view of U.S. Patent No. 4,911,103 to Davis et al. As amended claim 68 depends from amended claim 61, applicants submit that the rejection is addressed by nature of the claim's dependency.

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Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meisburger et al., Ishii et al., Nishimura et al., Kato et al., Tabrizi et al., Shimoyashiro et al., Grubb et al., and Beyer et al. as applied to claims 63, 65, and 71 above, Lo et al. as applied to claims 62, 73, and 74 above, and further in view of the English language abstract of Japanese Published Application Number 63-006737 to Furumiya (cited by Applicant in the Information Disclosure Statement filed on February 11, 2002). As amended claim 69 depends from amended claim 61, applicants submit that the rejection is addressed by nature of the claim's dependency.

Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meisburger et al., Ishii et al., Nishimura et al., Kato et al., Tabrizi et al., Shimoyashiro et al., Grubb et al., and Beyer et al. as applied to claims 63, 65, and 71 above, Lo et al. as applied to claims 62, 73, and 74 above, and further in view of U.S. Patent No. 4,607,167 to Petric and U.S. Patent No. 6,603,130 to Bisschops et al. As amended claim 70 depends from amended claim 61, applicants submit that the rejection is addressed by nature of the claim's dependency.

Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meisburger et al., Ishii et al., Nishimura et al., Kato et al., Tabrizi et al., Shimoyashiro et al., and Grubb et al. as applied to claims 61, 64, 75-78, and 82 above, and further in view of U.S. Patent No. 5,892,224 to Nakasuji. As claim 72 depends from amended claim 61, applicants submit that the rejection is addressed by nature of the claim's dependency.

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In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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